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TANAKA, et al., 10/790,212
08 February 2007 Amendment
Responsive to 08 November 2006 Office Action

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Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) An etching apparatus functioning to process a wafer having on a surface on which a desirably patterned mask for etching is formed, in a plasma etching process chamber and trim-treat said mask under etching action by plasma so as to reduce the width of said patterned mask, said apparatus comprising:

a plasma monitor for measuring an amount of radicals in said plasma process chamber; and

trimming condition calculating means for calculating a condition required for said-trimming treatment to obtain a desired mask width on the basis of a precedently measured width dimension of said patterned mask and a precedently measured amount of edge-roughness-sidewall striation of mask sidewalls in a lateral direction of the mask, as well as the amount of radicals measured by said plasma monitor,

wherein the trimming treatment is carried out for the trimming condition calculated by said trimming condition calculating means.

2. (Original) An etching apparatus according to claim 1, wherein continuously to said trimming treatment, a treatment of etching said wafer is performed in said plasma etching process chamber.

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3. (Currently Amended) An etching apparatus according to claim 1, wherein
the ~~edge roughness sidewall striation~~ amount is calculated on the basis of an aspect
ratio of a mask ~~edge roughness sidewall striation~~ portion.

4. (Currently Amended) An etching apparatus according to claim 1, wherein
the ~~edge roughness sidewall striation~~ amount is calculated on the basis of a Fourier
frequency of the shape of a mask ~~edge roughness sidewall striation~~ portion.

5. (Original) An etching apparatus according to claim 1, wherein an optical
emission spectrometer is used as said plasma monitor.

6. (Original) An etching apparatus according to claim 1, wherein said required
condition is a time required for the trimming treatment.

7. (Withdrawn) A mask trimming method in which a wafer having on the
surface of which a patterned mask for etching is formed is processed in a plasma
etching process chamber and thereafter, plasma is generated in said plasma etching
process chamber to trim-treat said mask under the etching action by said plasma so
as to reduce the width of said patterned mask,

said method comprising:

measuring an amount of radicals in said plasma process chamber by means
of a plasma monitor;

calculating a condition required for trimming treatment to obtain a desired
mask width, on the basis of the amount of radicals measured by said monitor as well

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as a precedently measured width dimension of said patterned mask and a precedently measured amount of mask sidewall striations; and
carrying out the trimming treatment for the calculated trimming condition.

8. (Withdrawn) A mask trimming method according to claim 7, wherein an etching treatment is carried out in said plasma etching process chamber continuously to execution of said mask trimming step.

9. (Withdrawn) A mask trimming method according to claim 7, wherein said required condition is a time required for the trimming treatment.

10. (Currently Amended) An etching apparatus functioning to process a wafer having on a surface on which a desirably-patterned mask for etching is formed, in a plasma etching process chamber and trim-treat said mask under etching action by plasma so as to reduce the width of said patterned mask to a target width, said apparatus comprising:

a plasma monitor for measuring an amount of radicals in said plasma process chamber; and

trimming condition calculating means for calculating a condition required for said trimming treatment to obtain a desired mask width on the basis of a precedently measured width dimension of said patterned mask and a precedently measured amount of lateral edge roughness laterally sidewall striations along vertical mask sidewalls, as well as the amount of radicals measured by said plasma monitor.

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wherein the trimming treatment is carried out for the trimming condition calculated by said trimming condition calculating means.

11. (Previously Presented) An etching apparatus according to claim 10, wherein continuously to said trimming treatment, a treatment of etching said wafer is performed in said plasma etching process chamber.

12. (Currently Amended) An etching apparatus according to claim 10, wherein the ~~lateral edge roughness~~ sidewall striation amount is calculated on the basis of an aspect ratio of a mask ~~edge roughness~~ sidewall striation portion.

13. (Currently Amended) An etching apparatus according to claim 10, wherein the ~~lateral edge roughness~~ sidewall striation amount is calculated on the basis of a Fourier frequency of the shape of a mask ~~edge roughness~~ sidewall striation portion.

14. (Previously Presented) An etching apparatus according to claim 10, wherein an optical emission spectrometer is used as said plasma monitor.

15. (Previously Presented) An etching apparatus according to claim 10, wherein said required condition is a time required for the trimming treatment.